REMARKS

In the aforementioned Office Action, the Examiner rejected claims 1-4, 6-17, 19-24, and 26-38 under 35 U.S.C. §103(a) as being obvious over Krueger in view of Tobinaga et al. The Examiner indicated that claims 5, 18, 25, and 39 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Such indication is appreciated. Applicant has added new claims 50-53 to incorporate the subject matter of allowable claims 5, 18, 25, and 39. These new claims include all of the limitations of the respective base claim and the intervening claims.

The Examiner combined Krueger (USP 5,816,221) with Tobinaga et al. (USP 4,895,120) in rejecting each of the independent claims -- claims 1, 15, 21, and 34. The Examiner stated that Krueger disclosed an electronic engine control system, but admitted that it did not determine reverse running and the disabling of a firing sequence in a two-stroke engine. The Examiner states that Tobinaga et al. teaches that it is known to determine reverse running and to disable the firing sequence in a two-stroke engine. The Examiner referred to col. 5, lns.56-61 for indication of rotation position and col. 16, lns. 23-43 for reverse running determination and disabling of the firing sequence. The Examiner then stated it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the electronic engine control of Krueger for use in a two-stroke engine and to include a reverse running disabling feature, as taught by Tobinaga et al. The Examiner stated that the motivation to combine these references is "to provide an operative engine and to prevent damage to the engine."

Applicant first will address the statement by the Examiner regarding the motivation to combine the references. Applicant believes that Krueger teaches both an operative engine and one that prevents damage to the engine. Applicant has no reason to believe that Tobinaga et al. discloses a system that is inoperative or damages the engine. The Examiner has not stated a reasonable motivation to combine these references.

While Tobinaga et al. does describe a reverse operation prevention control, it does not do so in a manner that is called for in the claims of the present application. The present invention is claimed in the context of providing fast starting in a manual or rope start two-stroke engine. Since Tobinaga et al. discloses a system having a battery, the same inherent problems are not present as in a rope start engine.

Claim 1 has been amended to clarify that the manual driving step not only provides rotation of the engine, but also provides power to a control system to enable the remaining steps of the claim. This amendment was not made for patentability reasons, but to clarify the claim technically. Claim 1 was also amended to specify that determining an absolute rotational position of the component is done within a time as minimal as less than a single revolution of the engine after generating sufficient power to energize the control system, and to specify that the step of enabling an engine firing sequence upon determining absolute rotational position of the component is done in order to start the engine upon a single manually driving action. These amendments clearly define the invention over the art of record since neither Tobinaga et al. nor Krueger disclose or suggest such a combination, together with the other limitations of claim 1. As previously mentioned, Tobinaga et al. utilizes a battery 24 to provide power, and

therefore, the Tobinaga et al. reference does not have the inherent problems the present invention is intended to overcome. Further, referring to Fig. 6 of Tobinaga et al. and col. 6, lns. 37-62, Tobinaga et al. uses three pulser coils 32a, 32b, and 32c which are arranged at 120° intervals and generate a pulse at each 60° rotation of the crankshaft 12. These pulser coils 32 "produce, with each rotation of the crankshaft 12, the pulses corresponding in number to the number of engine cylinders, at predetermined angular positions of the crankshaft 12." Col. 7, lns. 15-20. While the rotational position of the crankshaft in this arrangement can be determined by counting a relatively small number of pulses, it cannot be done within a time period that is under a single revolution of the engine (i.e. because the pulser coils are equally spaced). This system, combined with Krueger, therefore could not render the present invention obvious.

Regarding independent claim 15, element (A) has been amended for technical accuracy, and not to define over the prior art. That is, the manually driving of a rotational component of the engine first provides power to a control system in order for the remaining elements to be performed. Claim 15 further calls for determining absolute rotational position before the component rotates more than 270° which is based on detecting rotation through first and second rotational positions of the rotational component -- which is not possible in the system of Tobinaga et al. since the pulser coils 32a, 32b, and 32c are arranged at 120° equally spaced intervals. Further, claim 15 calls for enabling the firing sequence immediately upon determining the absolute rotational position of the engine and then detecting rotation of the component through a third

position which is angularly spaced ***unequally*** from the first position and from the second position -- which is also not disclosed or suggested in either Tobinaga et al. or Krueger.

Further, Tobinaga et al. teaches a reverse prevention control wherein the output pulses from the pulser coils 32 corresponding to respective cylinders are analyzed to determine if the pulses corresponding to their respective cylinders are in a correct order, i.e. P_1, P_2, P_3, P_4, P_5, P_6. Claim 15 however calls for detection of rotational movement of a component through first and second rotational positions and a subsequent third rotational position which is angularly spaced unequally from the first and second rotational positions. Therefore, Applicant respectfully believes that claim 15 is not obvious by the teachings of Krueger in view of Tobinaga et al.

Referring now to claim 21, element (A) has been amended for technical clarification only. That is, it is noted that the manually powered starter, when actuated, drives a rotational component of the engine and powers a control to enable the control since the manually started two-stroke engine does not have a battery. While this happens to define over Tobinaga et al., the amendment was not made to overcome Tobinaga et al. Again, the amendment was made for clarity and for completeness of the claim. Element (5) has been added as an act performed by the computer to clearly define the invention over any combination of Tobinaga et al. and Krueger. That is, the claim now specifically states that the acts of determining absolute rotational position and enabling the engine to start are carried out during a single actuation of the manually powered starter, and that acts (3) and (4) are carried out after the engine has been allowed to start. As previously stated, since Tobinaga et al. is not a manually started engine, it does not have the inherent

limitations of a manually started engine. Neither Tobinaga et al. nor Krueger disclose determining an absolute rotational position during a single actuation of a manually powered starter.

In the last independent claim, claim 34, the means for determining an absolute rotational position and the means for enabling an engine firing sequence have both been amended to specify that the rotational position is determined and the engine firing sequence is enabled during a single operation of the means for driving a rotational component of the engine. Claim 34 is believed to define over the combination of Tobinaga et al. and Krueger since neither define a manually started two-stroke engine in which the absolute rotational position is determined, and the engine is enabled to start, during a single operation of some type of manual starter.

New claims 40-49 have been added to further define the invention over the prior art. It is believed that claims 40-47 are allowable over the art of record.

Applicant believes that all pending claims in this application are now in condition for allowance and respectfully requests a Notice of Allowance for claims 1-53.

Applicant appreciates the Examiner's thoroughness in examining the instant application and indication of allowability for claims 5, 18, 25, and 39.

Marked-up versions of the amendments made above may be found on pages 17-20.

Applicant cordially invites the Examiner to contact the undersigned with any questions and/or comments regarding this matter to expedite processing of this application.

Respectfully submitted,

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REVISIONS

1. (Amended) A method of starting a two-stroke engine comprising:

(A) manually driving a rotational component of the engine to rotate and provide power to a control system;

(B) determining an absolute rotational position of the component within a time as minimal as less than a single revolution of the engine after generating sufficient power to energize the control system;

(C) enabling an engine firing sequence upon determining the absolute rotational position of the component to start the engine upon a single performance of step (A); then

(D) determining a rotational direction of the component based on continued monitoring of the rotation of the component; and then

(E) disabling the engine firing sequence if is determined in step (D) that the component is running in a reverse direction.

15. A method of starting a two-stroke battery-less engine, comprising:

(A) driving a rotational component of the engine to rotate by manually actuating a rope-start mechanism~~, the component comprising one of a crankshaft and a flywheel~~; to provide power to a control system and thereafter:

(B) detecting rotation of the component through first and second rotational positions thereof;

(C) determining, based on the detecting step, an absolute rotational position of the component, the determining step occurring before the component rotates more than 270°; then

(D) enabling an engine firing sequence immediately upon determining the absolute rotational position of the engine, the enabling step comprising enabling the supply of energizing current to at least one of am electronic injection system of the engine and an electronic ignition system of the engine; then

(E) detecting rotation of the component through a third position which is angularly spaced unequally from the first position and from the second position; then

(F) determining, based on the step (E), whether the component is rotating in a forward direction or a reverse direction; and

(F) disabling the engine firing sequence if it is determined in step (F) that the engine is running in the reverse direction.

21. (Amended) A two-stroke engine comprising:

~~(A)~~ a manually-powered starter which, when actuated, drives a rotational component of the engine to rotate~~;~~ and power a control, the control including:

(~~B~~A) a monitor which monitors rotation of the rotational component;

(~~C~~B) an electrically powered device which, when energized, affects at least one aspect of an engine firing operation; ~~and~~

(C) a computer which is coupled to the monitor and to the powered device and which is operable, in conjunction with the monitor and the powered device, to:

(1) determine an absolute rotational position of the component,

(2) enable a supply of energizing current to the powered device upon determining the absolute rotational position of the component,

(3) determine, based on continued monitoring of the rotation of the component after the absolute rotational position of the component has been determined, whether the component is rotating in a forward direction or a reverse direction, ~~and~~

(4) disable the supply of energizing current to the powered device if it is determined that the component is running in the reverse direction~~.~~; and

(5) wherein acts (1) and (2) are carried out during a single actuation of the manually-powered starter, and acts (3) and (4) are carried out after the engine has been allowed to start.

34. (Amended) A two-stroke engine comprising:

(A) means, responsive to a manually-input force, for driving a rotational component of the engine to rotate;

(B) means for determining an absolute rotational position of the component during a single operation of the means for driving a rotational component of the engine;

(C) means for enabling an engine firing sequence upon determining the absolute rotational position of the component during a single operation of the means for driving a rotational component of the engine;

(D) means for determining a rotational direction of the component based on continued monitoring of the rotation of the component after the absolute rotational position of the component is determined; and

(E) means for disabling the engine firing sequence if the means for determining the rotational direction of the component determines that ~~that~~ the component is running in a reverse direction.